Rocky Trails!
Field Program
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Revised 1/10/01

Grade: Third

Subject: Earth Science

Theme: The rocks at Red Rock Canyon have created diverse landforms.

Goal: Students will classify rocks and identify Red Rock Canyon rocks.

Objective: The students will be able to (a) classify the three main types of rocks- igneous, metamorphic, and sedimentary, (b) identify three or four rocks found in Red Rock Canyon, (c) describe some of the various land forms of Red Rock Canyon.

Curriculum:

Science (3) 3.2 compare, test, measure, record, describe observable properties of rocks and minerals.
Science (3) 3.3 describe how the Earth is composed of different land forms

Background: Rocks are aggregates of minerals. There are three main types of rocks: igneous, sedimentary, and metamorphic. Each group is formed by distinctive geological processes. Igneous rocks are those that form from molten rock or magma. Sedimentary rocks form either from particles that settle out of wind, water, or ice and are compacted and cemented to form rock or by precipitation of minerals from sea water. Metamorphic rocks are formed when pre-existing igneous , metamorphic, or sedimentary rocks are changed due to heat and/or pressure.

The rocks at Red Rock Canyon are all sedimentary and are mainly sandstones and limestones as well as some shales. The sandstones were formed as large wind-blown dunes and the limestones were formed in a shallow sea environment. The mountains were built during the process of uplift related to tectonic events.

Vocabulary:

**fossil**- the remains of past plants or animals found in rocks.
**geology**- the science that deals with the study of the planet Earth- what it is made of, how it changes, why it changes, and its history.
**igneous rock**- a rock cooled from a molten or liquid form(magma).
**limestone**- a sedimentary rock made of the mineral calcite.
**metamorphic rock**- a rock changed from its original form by heat, pressure, or chemical action.
**mineral**- a natural, nonliving solid made up of elements like silicon, oxygen, carbon, and iron.
**rock**- a natural combination of one or more minerals.
**sandstone**- a sedimentary rock made up of sand grains cemented together.
**sedimentary rock**- a rock made up of pieces of older rocks, parts of plants, and animals.
**shale**- a sedimentary rock made of clay.

Key Points:

- Geology is the science of the study of the earth and its landforms, how they are formed, and change over time.

- 400 million years ago a shallow sea covered the Red Rock area.
- The deposits of sea creatures left behind created limestone.
- This sea changed to tidal flats that dried up leaving behind salt beds called gypsum.
- When the seas receded the area became sandy, windblown desert which cemented together by natural chemistry forming layon upon layer of sandstone beginning 180 million years ago.
- The sand dunes stretched eastward to Colorado – with sand ½ mile deep in places.
- Sandstone Rocks are red due to the varying concentration of iron oxide in the rock cement the grains of sands together and show up as red, pink, tan colors .

Pre-Visit Activity: Go over the vocabulary with the students. It is important that they are familiar with the terms. Have the students brainstorm about different landscapes and rocks that they have seen.

Activities on Onsite:

- Discuss what a geologist does

- Discuss the formation of rocks including the different ways in which rocks are formed with Red Rock Canyon as a backdrop.
  Review Visitor Center Display's on Geology of the Canyon

- Scavenger Hunt: Pass out card and markers. Students will be challenged to find for themselves some of the different rocks and materials that have been discussed. You can use the Moenkopi Trail or the path just behind the visitor center. It depends on how you want to work the short hike/scavenger hunt, but either point out the items or have the students point them out to make sure they understand the materials.

- "Rock Cycle Game" - The game involves progressing through the rock cycle. Pass out game pieces. Split class into 6 groups and play. Give instructions. Have children name the cycle they are passing through as they play.

Post-Visit Activity: The rock cycle can be compared and contrasted to other types of natural cycles(life cycles, etc), and students can brainstorm about why certain rocks/land forms would occur in certain areas. Students may also do a creative writing activity (worksheet enclosed) and they can be submitted to us, with some of them being posted on the Internet.

Conclusion: Rocks are a combination of one or more minerals that have formed over time by different scientific processs.

# Creative Writing Activity

One form of creative writing is poetry. The Cinquain poem does not need to rhyme. It describes a natural object different way. Just follow the directions below to write your Cinquain (pronounced Sin-cane; French or Spanish for five).

- Name your object in one word. _____
- Write 2 descriptive words about your object. _____
- Write 3 action words about your object. _____
- In 4 or 5 words describe its relationship to the environment. _____

  _____
- Sum up your feelings about the object in one word. _____

Here's an example of a Cinquain poem:

Ant
Small, Strong
Climbing, Stinging, Gathering
Little Scavenger of the Desert
Persistence